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Information Paper

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Columbia River Channel Improvement Study – Sediment Quality

Sediment quality analyses are required by the Clean Water Act of 1977 (Public Law 92-500) and the Marine Protection, Research, and Sanctuaries Act of 1972 (Public Law 92-532). Applicable national and regional testing manuals, such as the draft *Dredged Material Evaluation Framework, Lower Columbia River Management Area*, provide guidance for the evaluation of the dredged material proposed for unconfined in-water placement. Those documents describe a four-tiered approach to sediment quality evaluation. Sediment physical and chemical analyses as conducted under this study are a Tier II evaluation. Sediments that exceed any established screening level (SL) require additional testing at a higher tier (Tier III-Biological Testing) before a determination of suitability for unconfined in-water disposal can be made.

In June 1997, 89 stations were sampled from the Columbia River Channel, river mile (RM) 6.0 to RM 106.2, for physical analysis. Twenty-three were further analyzed for chemical contaminates. Those 23 samples were chosen because of their proximity to industry, urbanization and known contamination, or to provide even coverage of the study area. On the Willamette River, RM 0.10 to RM 11.55, 68 samples were collected from 43 stations and subjected to physical analyses. Forty-five samples (including composite and replicate samples) were selected for chemical analyses. Chemical analyses for chemicals of concern included: heavy metals (nine); polynuclear aromatic hydrocarbons (PAHs); total organic carbon (TOC); acid volatile sulfides (AVS); pesticides/polychlorobiphenyls (PCBs); pore-water tributyltin (TBT); and P450 Reporter Gene System (RGS), a dioxin/furan screen.

Sediment in the Columbia River navigation channel is predominantly sand with a low percentage of fines, low organic content, and far removed from known contaminate sources. No screening level was exceeded for any contaminate of concern. The material has been determined suitable for unconfined in-water disposal with no further testing for sediment quality required. The material also is considered suitable for upland placement.

On the Willamette River, the screening level for mercury and lead was exceeded in one sample each, pore water TBT SL exceeded in two samples (see table). Total DDT SL was exceeded in nine samples while only one other pesticide, Dieldrin, exceeded the SL. Total PCB SL was exceeded in one sample. Samples WR-BC-20 and -22 exceeded almost all the individual PAH SLs, and the SL for both total high and total low PAHs. Samples WR-BC, GC-21, -11A and 15 exceeded SLs for two PAHs. Sample WR-BC-16/17 exceeded one PAH SL. Sample WR (BC, GC)-11 through -22 are located between RM 2.9 and RM 6.2 on the Willamette River. Results from the P450 RGS screening analyses indicated additional evaluation for dioxin/furan is warranted at station location WR (BC, GC)-22, 32A and 38A. Additional evaluation of sediment quality at higher tiers, including bioassays and bioaccumulation testing, would be required prior to determination of the suitability of these Willamette River sediments for unconfined in-water disposal. It is believed that some sediments in the Willamette River are not suitable for unconfined in-water disposal. If dredged, confined disposal would be required.

Willamette River Exceedances of Screening Levels

SITE	RM	METALS		PESTICIDES					SL Exceedances
		Pb	Hg	DIEL-DREN	TOTAL DDT	TOTAL PCBs	PAHS	TBT	1997
WR-BC-01	0.10								
WR-A	0.10								
WR-GC-02A	0.10								
WR-GC-02B	0.10								
WR-BC-03	0.40								
WR-GC-04A	0.80				■				1
WR-GC-04B	0.80				■				1
WR-GC-05A	0.80								
WR-GC-05B	0.80								
WR-GC-06A	0.95								
WR-GC-06B	0.95								
WR-BC-07	1.60								
WR-BC-08	1.70								
WR-BC-09	2.05								
WR-BC-10	2.45								
WR-B	2.45								
WR-GC-11A	2.90						■		1
WR-BC-12, 13, 14	3.40								
WR-BC-15	3.80						■		1
WR-BC-16	4.10						■		1
WR-GC-18A	5.10								
WR-GC-19A	5.10								
WR-BC-20	5.15						■		1
WR-BC-21	5.90				■			■	2
WR-BC-22	6.20						■		1
WR-BC-23	6.50							■	1
WR-GC-24A	6.70				■				1
WR-GC-24B	6.70								
WR-GC-25A	6.70				■				1
WR-BC-26, 27, 28	6.90								
WR-BC-29	7.50				■				1
WR-C	7.50				■				1
WR-GC-30A	8.50								
WR-GC-31A	8.90								
WR-GC-32A	10.00								
WR-GC-33A	10.10								
WR-GC-34A	10.00								
WR-GC-35A	10.10				■				1
WR-BC-36	10.30								1
WR-GC-37A	11.10								
WR-GC-38A	11.20								
WR-GC-39A	11.65								
WR-CD-40A	11.30			■	■				2
WR-CD-41A	11.35								
WR-CD-41B	11.35								
WR-CD-42A	11.50								
WR-CD-42B	11.50								
WR-CD-42C	11.50		■			■			1
WR-CD-42D	11.50								
WR-CD-43A	11.55	■							1
WR-D	11.55								
WR-CD-43B	11.55								

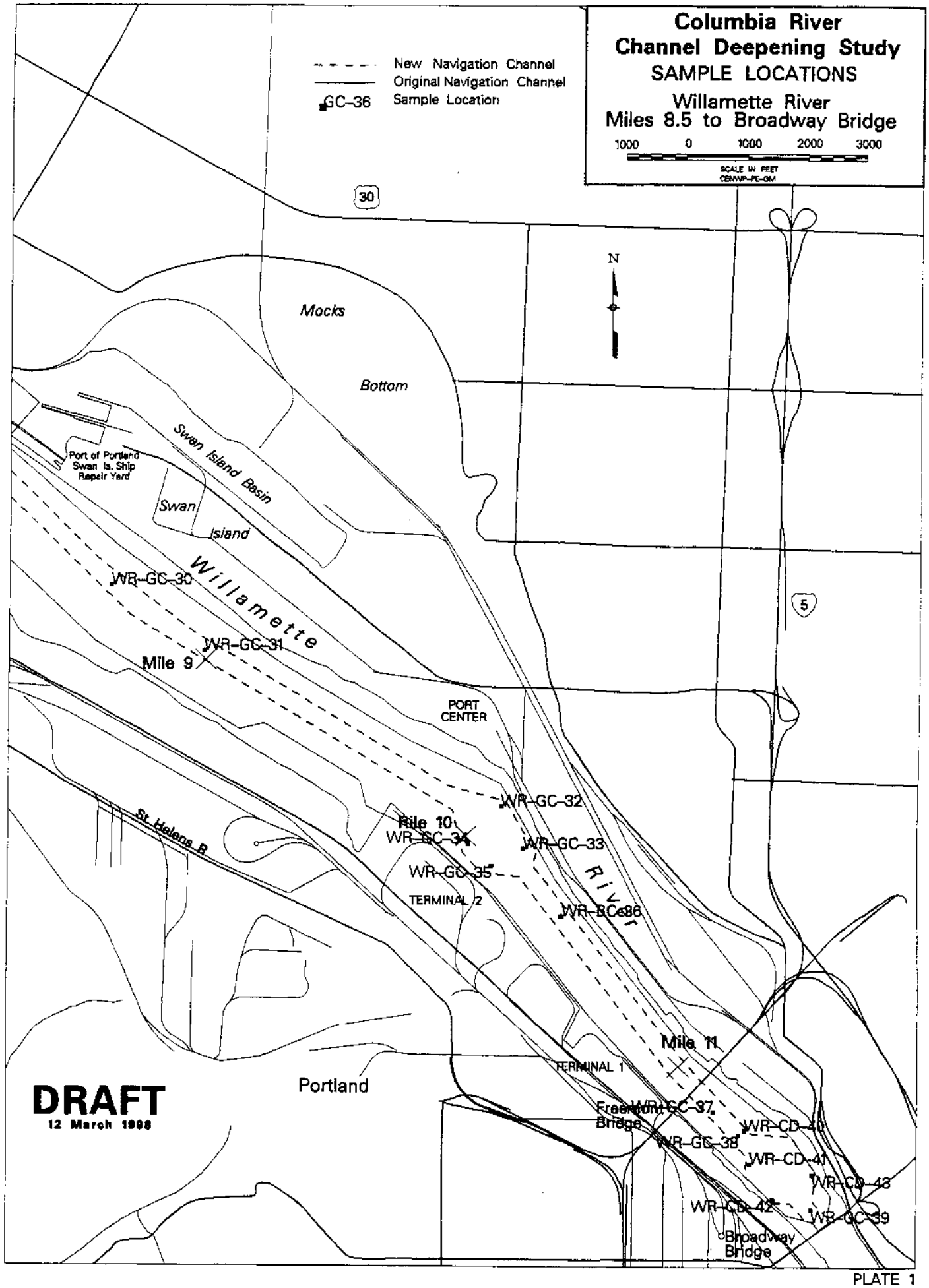
Columbia River
Channel Deepening Study
SAMPLE LOCATIONS
Willamette River
Miles 8.5 to Broadway Bridge
1000 0 1000 2000 3000
SCALE IN FEET
CENWP-PE-GM
New Navigation Channel
Original Navigation Channel
GC-36 Sample Location
30
N
Mocks
Bottom
Swan Island Basin
Port of Portland
Swan Is. Ship
Repair Yard
Swan
Island
Willamette
WR-GC-30
WR-GC-31
Mile 9
5
PORT
CENTER
WR-GC-32
Mile 10
WR-GC-34
WR-GC-33
WR-GC-35
TERMINAL 2
WR-GC-36
River
St Helens R
Mile 11
TERMINAL 1
Portland
Freemont
Bridge
WR-GC-37
WR-GC-38
WR-CD-40
WR-CD-41
WR-CD-43
WR-CD-42
WR-GC-39
Broadway
Bridge
DRAFT
12 March 1998

PLATE 1

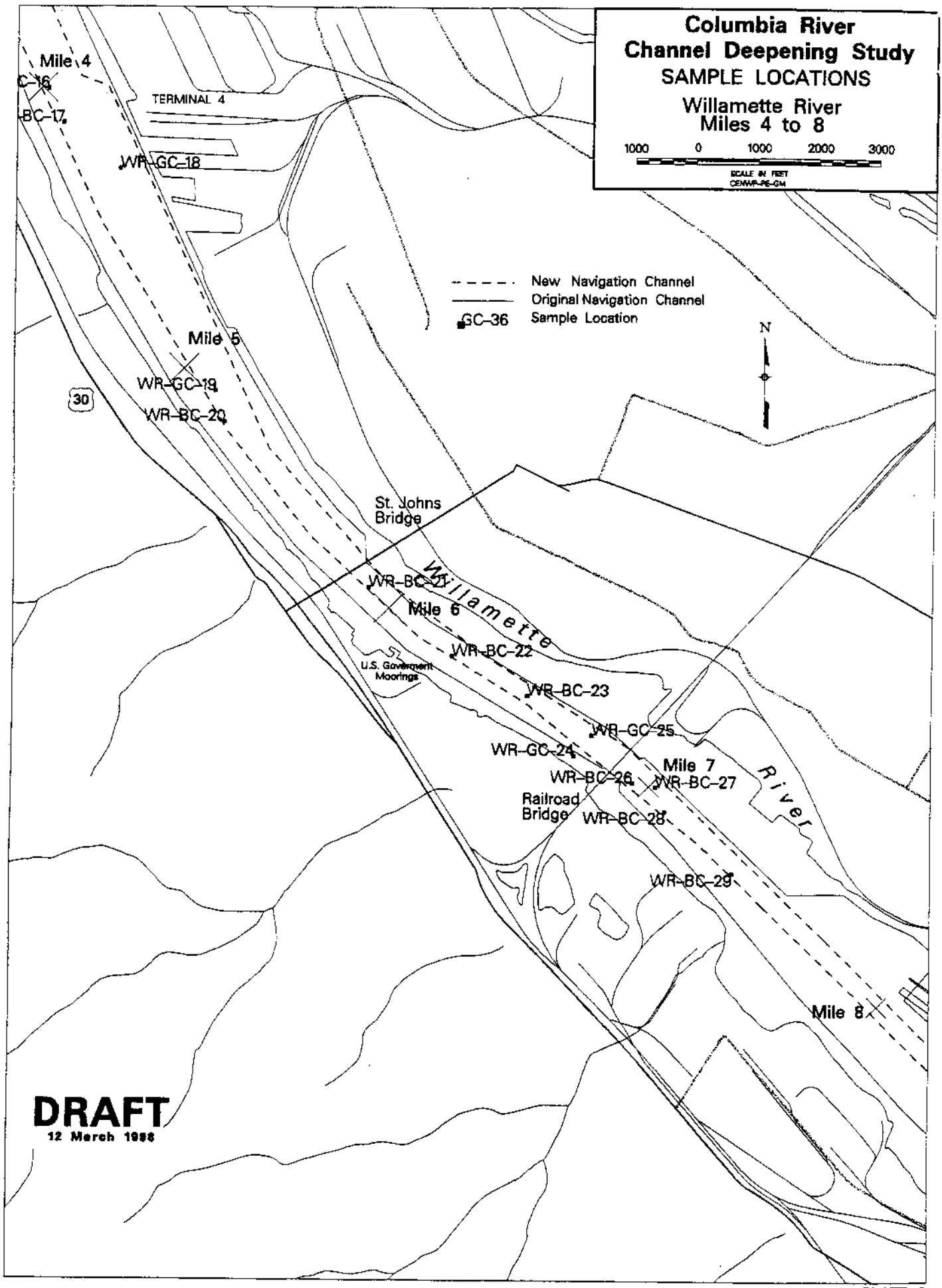
Columbia River
Channel Deepening Study
SAMPLE LOCATIONS
Willamette River
Miles 4 to 8
1000 0 1000 2000 3000
SCALE IN FEET
CENWP-PE-GM
New Navigation Channel
Original Navigation Channel
GC-36 Sample Location
N
Mile 4
C-16
BC-17
TERMINAL 4
WR-GC-18
Mile 5
WR-GC-19
WR-BC-20
30
St. Johns
Bridge
WR-BC-21
Mile 6
WR-BC-22
U.S. Government
Moorings
WR-BC-23
WR-GC-25
WR-GC-24
Mile 7
WR-BC-26
WR-BC-27
Railroad
Bridge
WR-BC-28
WR-BC-29
Mile 8
Willamette
River
DRAFT
12 March 1998

PLATE 2

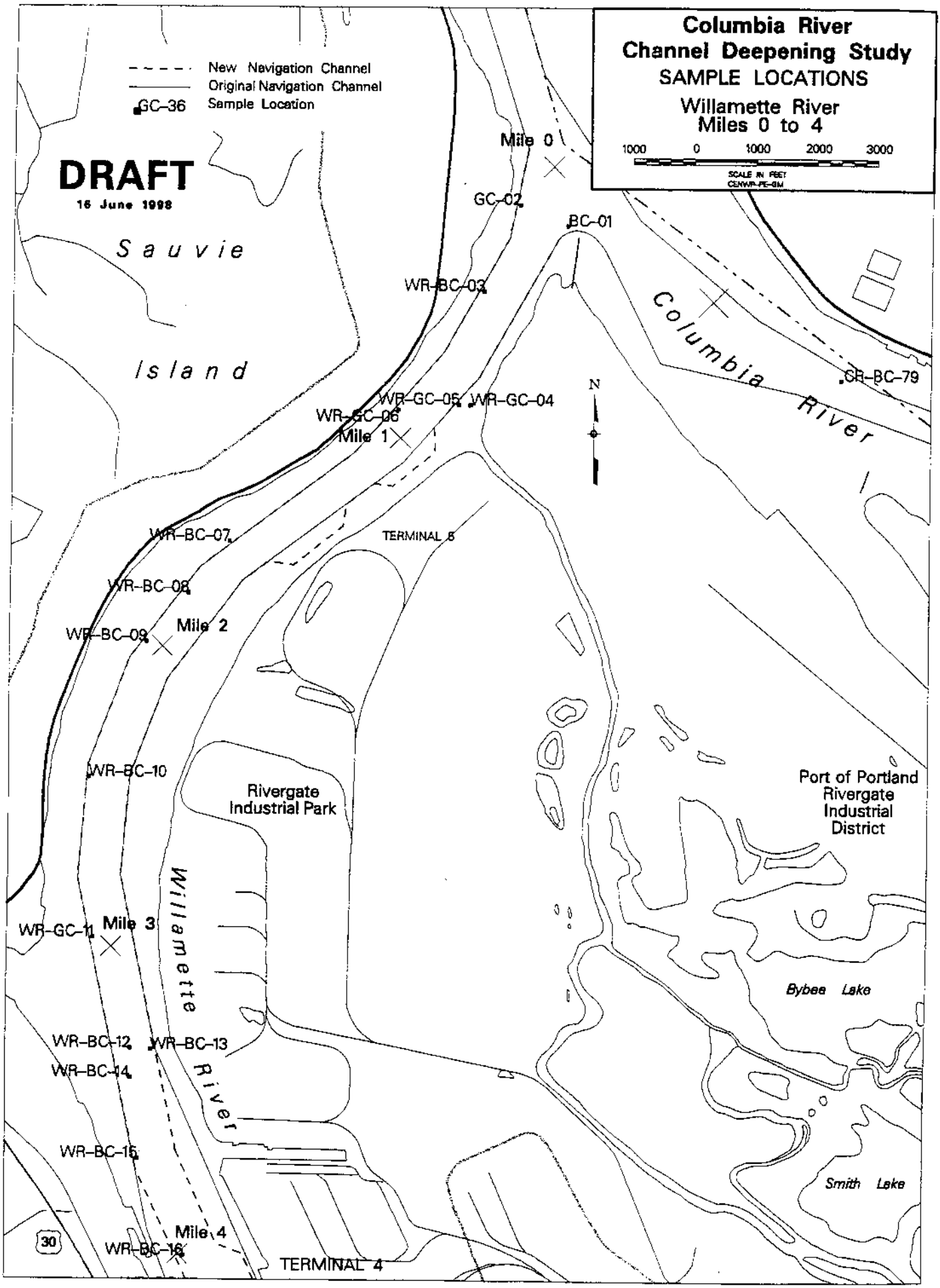
Columbia River
Channel Deepening Study
SAMPLE LOCATIONS
Willamette River
Miles 0 to 4
1000 0 1000 2000 3000
SCALE IN FEET
CENWP-PE-GM
New Navigation Channel
Original Navigation Channel
GC-36 Sample Location
DRAFT
16 June 1998
Sauvie
Island
Mile 0
GC-02
BC-01
WR-BC-03
Columbia River
CR-BC-79
N
WR-GC-05
WR-GC-04
WR-GC-06
Mile 1
WR-BC-07
TERMINAL 5
WR-BC-08
WR-BC-09
Mile 2
WR-BC-10
Rivergate
Industrial Park
Port of Portland
Rivergate
Industrial
District
Willamette River
WR-GC-11
Mile 3
Bybee Lake
WR-BC-12
WR-BC-13
WR-BC-14
WR-BC-15
Smith Lake
30
Mile 4
WR-BC-16
TERMINAL 4

PLATE 3